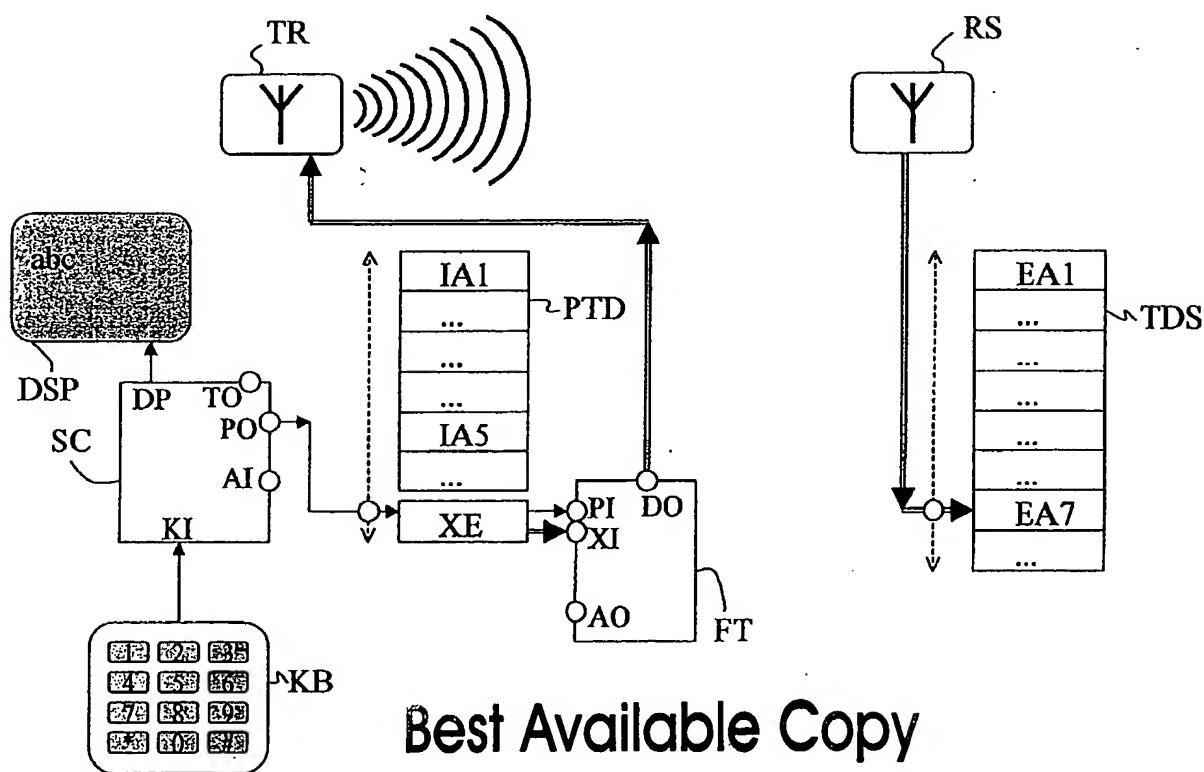


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(54) **REPertoire TELEPHONIQUE HIERARCHIQUE**  
(54) **FALL THROUGH TELEPHONE DIRECTORY**



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(57) A telecommunication user terminal, such as a traditional telephone set or a mobile telephone, provided with a personal address book or internal database (PTD), e.g. located on a user's smart-card. The internal database has several memory locations (IA1,...,IA5, ...) each storing a call reference that may be selected as calling number by a search key entered by the user on a keyboard (KB) of the telephone. The internal database further has an extra memory location (XE) that stores an extra call reference to a second database (TDS) and that is used in case no matching is found with the other call references. The second database is an external directory service controlled by an operator or service provider. The internal and external database complement one another in a transparent way for the user owing to a fall- through selection circuit (FT) also forming part of the telephone.

**ABSTRACT**

A telecommunication user terminal, such as a traditional telephone set or a mobile telephone, provided with a personal address book or internal database (PTD), e.g. located on a user's smart-card. The internal database has several memory locations (IA1, ..., IA5, ...) each storing a call reference that may be selected as calling number by a search key entered by the user on a keyboard (KB) of the telephone. The internal database further has an extra memory location (XE) that stores an extra call reference to a second database (TDS) and that is used in case no matching is found with the other call references. The second database is an external directory service controlled by an operator or service provider. The internal and external database complement one another in a transparent way for the user owing to a fall-through selection circuit (FT) also forming part of the telephone.

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**FALL THROUGH TELEPHONE DIRECTORY**

The present invention relates to a telecommunication user terminal including a database with a plurality of memory locations each adapted to store a call reference, said user terminal further including selection means adapted to  
5 select one of said memory locations according to a predetermined input in said user terminal and to allow a connection to be setup according to the selected call reference.

Such a telecommunication user terminal is generally known in the art. It may for instance be a typical telephone subscriber set or, preferably, a  
10 mobile telephone. The database of the user terminal is a personal telephone directory and the call references are phone numbers. Each of these phone numbers is a translation of the code, abbreviation or name dialed on the keyboard of the terminal as predetermined input. In case of a mobile telephone, the database or personal telephone directory is loaded on a  
15 smart-card inserted in the telephone. This user personal telephone directory may be combined with another personal telephone directory internal to the telephone, forming then also part of the database. This internal personal telephone directory is in fact the only one present in a fixed telephone.

When one or more alphanumeric characters are entered (dialed)  
20 in the telecommunication user terminal or after a "select" instruction, the selection means scans the database or personal telephone directory in order to find a memory location corresponding to this input. If found, the call reference contained in the pointed memory location is transmitted to the selection means. This allows the telecommunication user terminal to setup a  
25 connection to a subscriber or to an address corresponding to the selected call reference.

A problem with a database included in a telecommunication user terminal is that the amount of entries thereof is generally limited. Also the size of the memory locations is predefined and may not be exceeded. Additionally, the  
30 call references of the database have generally to be loaded and updated

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manually by the user. To search for information on other telephone services, e.g. in different address books or databases such as the ones provided by network operators or service providers, a special call to these services has to be setup with the goal of searching the information therein. This requires the knowledge of the references or addresses of these services in order to call them up.

An object of the present invention is to provide a telecommunication user terminal of the above known type but which has an easy and user friendly access to a database that is relatively much larger than the one included in the known telecommunication user terminal.

According to the invention, this object is achieved due to the fact that said database includes an extra memory location adapted to store an extra call reference to a second database, said second database being external to said telecommunication user terminal and including second memory locations each adapted to store a second call reference, and that said telecommunication user terminal further includes fall-through selection means adapted to couple said selection means to said second database in order to select one of said second memory locations according to said predetermined input and to allow a connection to be setup according to the selected second call reference.

In this way, the user is provided with an easy access mechanism to a global directory service. By adding only one extra memory location, the amount of possible memory locations to select is increased by the size of the second database. Since the second database is external to the user terminal, it may be relatively much larger. Also larger (second) call references may be available. As a result, the user has an automatic and transparent access to a very large virtual database, e.g. the telephone directory service provided by a network operator. Moreover, no additional action has to be taken by the user to switch from his user and/or internal personal directory or database to the external second database when an entry, for which the user is searching, is not found in the first database.

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In more detail, the present invention is characterized in that said fall-through selection means establishes a connection between said telecommunication user terminal and said second database according to said extra call reference and is adapted to recover the selected second call reference  
5 and to transmit it to said selection means.

In this way, the user has not even to know the reference for calling the second database.

Further characteristic features of the present telecommunication set are mentioned in the appended claims.

10 The above and other objects and features of the invention will become more apparent and the invention itself will be best understood by referring to the following description of an embodiment taken in conjunction with the accompanying drawings wherein:

Fig. 1 schematically represents a common operation of a  
15 telecommunication user terminal with an internal database PTD according to the invention; and

Figs. 2 to 4 represent successive steps of an operation of the user terminal of Fig. 1 for recovering a call reference from an external database TDS.

The block diagram shown at Fig. 1 schematically represents circuits of  
20 a telecommunication user terminal such as for instance a traditional telephone subscriber set or a mobile telephone, as will be described in more detail in the following example. The telephone has an input keyboard KB and a display DSP showing the alphanumeric characters, i.e. characters or digits, entered by a user on the keyboard KB. The telephone is further provided with a database PTD that  
25 is generally implemented as personal telephone directory or address book of the user. The database PTD forms part either of the terminal itself or of a smart-card that may be inserted in the terminal. In case of a mobile telephone, the database PTD is generally constituted by a combination of these two types of memories that operate individually or that complement one another in a transparent way. Since  
30 the database PTD is internal to the telephone, its size is rather limited. Therefore,

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the telecommunication user terminal or telephone of the present invention is provided with a fall-through selection circuit FT, as shown at Fig. 2. As will be explained in more detail later, the fall-through selection circuit FT allows to establish a link to an external database TDS in case the searched item is not found in the internal database PTD.

The operation of the telecommunication user terminal using the internal database PTD as well as the external database TDS will be explained hereafter.

When the user is searching for a reference in a database, he enters a name, an abbreviation or a code, e.g. "abc", as search key or input on the keyboard KB. This information is transmitted from KB to an input KI of a selection circuit SC, also included in the telephone, as shown at Fig. 1. The selection circuit SC sends the search key both to the display DSP via an output DP and to the internal database PTD as a pointer PO via a like-named output. The pointer PO scans the internal database PTD in order to find therein a memory location IA1, ..., IA5, ... that contains a call reference corresponding to the search key. If such a call reference is found, say IA5 having here the same name as the corresponding memory location, it is transferred to an input AI of the selection circuit SC. The call reference IA5 is generally a calling number of a person whose name or any other reference has been entered as input on the keyboard KB and it can thus be used as such for calling this person. To this end, the call reference IA5 is transmitted via an output TO of SC towards an output circuit TR of the telephone, and so further to a telephone exchange (not shown). In case of a traditional telephone, the output circuit TR is coupled to a wall connector of the subscriber set, whilst in case of a mobile telephone the output circuit TR is the transmission circuit coupled to the antenna. The output circuit TR will however not be described in more detail hereafter because it is well known by any person skilled in the art.

In case no matching call reference is found in the memory locations IA1, ..., IA5, ... of the database PTD, the pointer PO drops automatically to an

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extra memory location XE of this database PTD. As shown at Fig. 2, the contains  
XE of the like-named extra memory location is then transferred to an input XI of a  
fall-through selection circuit FT, also included in the telephone. The pointer PO  
itself is also transferred to the fall-through selection circuit FT via an input PI  
5 thereof. The fall-through selection circuit FT uses the call reference XE as calling  
number for an external database TDS by providing it to the output circuit TR of  
the telephone via an output DO of FT. The external database TDS includes  
memory locations EA1, ..., EA7, ... and is coupled to a transmitter/receiver circuit  
RS similar to the output circuit TR of the telephone. The external database TDS  
10 operates in a similar as the internal database PTD but may be much larger since  
it is external to the telephone. TDS provides an enhanced telephone directory  
service controlled by a network operator or a service provider.

When a communication is established between the circuits TR and RS,  
the pointer PO is transferred to the external database TDS where it is again used  
15 as a pointer for scanning the memory locations EA1, ..., EA7, ... When a call  
reference matching the pointer PO is found, say EA7 having here the same name  
as the corresponding memory location, it is transferred to the transmitter/receiver  
circuit RS, as shown at Fig. 3. From RS, the call reference EA7 is transmitted to  
the fall-through selection circuit FT via the output circuit TR of the telephone and  
20 an input DO of FT.

Referring now to Fig. 4, the call reference EA7 is further transferred via  
an output AO of the fall-through selection circuit FT to the input AI of the  
selection circuit SC. From the input AI, the call reference EA7 is transmitted as  
calling number to the output TO of SC towards the output circuit TR of the  
25 telephone and so further to a telephone exchange as already mentioned above.

The above operations provide the user with an option to automatically  
contact an external directory service when no matching is found for a search key  
in his internal or personal address book.

Additionally, because of the clear separation between the internal  
30 address book and the external directory service, an adaptation or insertion of a

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new entry can be left open to the user or can be done automatically by the operator or service provider himself. This may for instance be done through the connection mentioned above between the circuits RS and TR.

Other enhancements are also possible. For example, if the retrieved  
5 call reference EA7 of the external database TDS is represented in a  
predetermined format, the telecommunication user terminal can take appropriate  
actions to store/cache it in its internal database PTD without any user  
intervention. These actions could be performed by the inter-operation of the fall-  
through selection circuit FT and the selection circuit SC, or by any other circuit not  
10 shown here. In the long run, this will increase the chance of finding a correct call  
reference in the personal address book or internal database PTD and therefore  
limiting the amount of hits on the external directory service or database TDS.  
This is particularly useful in case the user has to pay on a per-search basis. In this  
case, it is likely that the service can't be made that transparent as described  
15 above. The user then probably wants to know how many times he actually  
contacted the external directory service TDS to find out how much he will have to  
pay for it.

While the principles of the invention have been described above in  
connection with specific apparatus, it is to be clearly understood that this  
20 description is made only by way of example and not as a limitation on the scope  
of the invention, as defined in the appended claims.



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**CLAIMS**

1. Telecommunication user terminal including a database (PTD) with a plurality of memory locations (IA1, ..., IA5, ...) each adapted to store a call reference, said user terminal further including selection means (SC) adapted to  
5 select one of said memory locations according to a predetermined input (KB) in said user terminal and to allow a connection to be setup according to the selected call reference, characterized

in that said database (PTD) includes an extra memory location (XE) adapted to store an extra call reference to a second database (TDS), said second  
10 database being external to said telecommunication user terminal and including second memory locations (EA1, ..., EA7, ...) each adapted to store a second call reference, and

in that said telecommunication user terminal further includes fall-through selection means (FT) adapted to couple said selection means (SC) to said  
15 second database in order to select one of said second memory locations according to said predetermined input (KB) and to allow a connection to be setup according to the selected second call reference.

2. Telecommunication set according to claim 1, characterized in that  
20 said telecommunication user terminal is a mobile telephone and in that the first mentioned database (PTD) is a user personal telephone directory loaded on a smart-card inserted in said mobile telephone.

3. Telecommunication set according to any of the claims 1 or 2,  
25 characterized in that the first mentioned database (PTD) includes the internal personal telephone directory of said telecommunication user terminal.

4. Telecommunication set according to claim 1, characterized in that  
said fall-through selection means (FT) establishes a connection between said  
30 telecommunication user terminal and said second database (TDS) according to

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said extra call reference and is adapted to recover the selected second call reference and to transmit it to said selection means (SC).

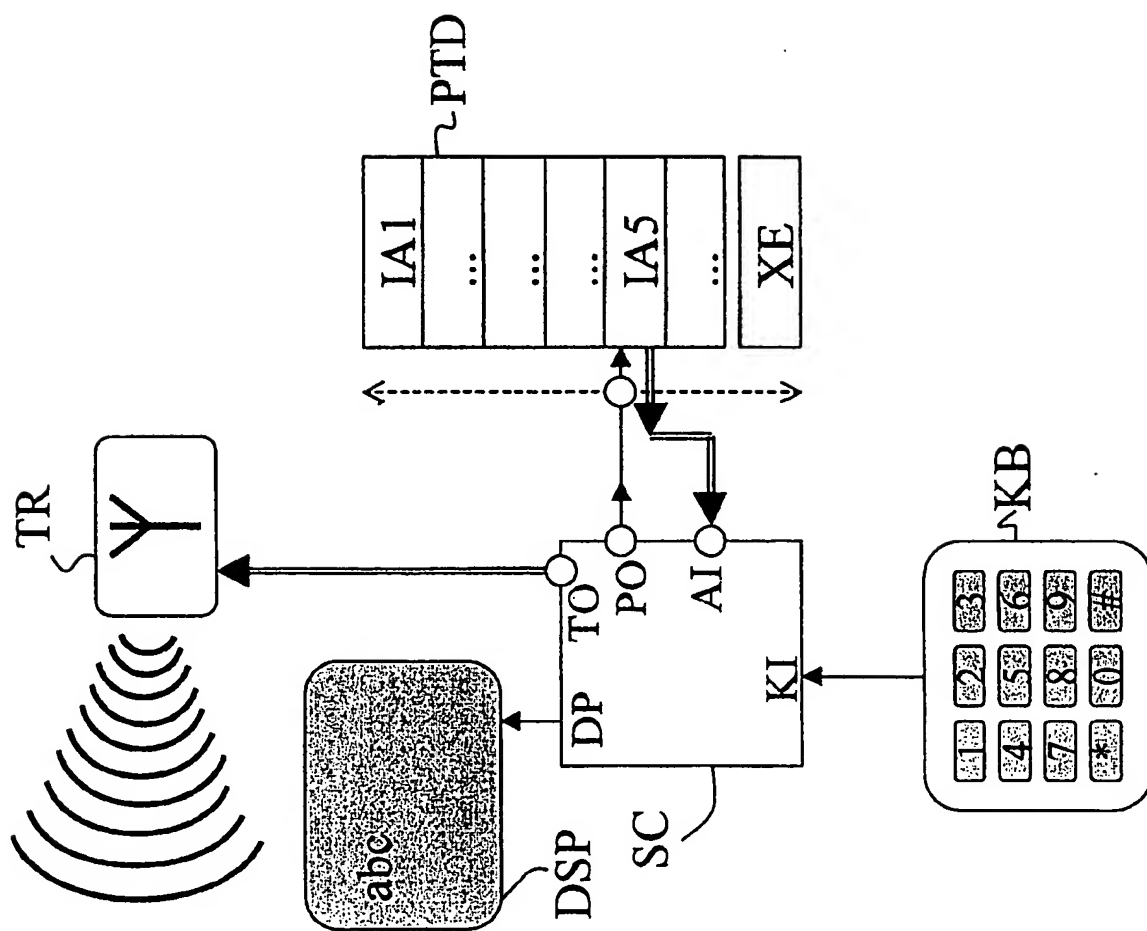


Fig. 1

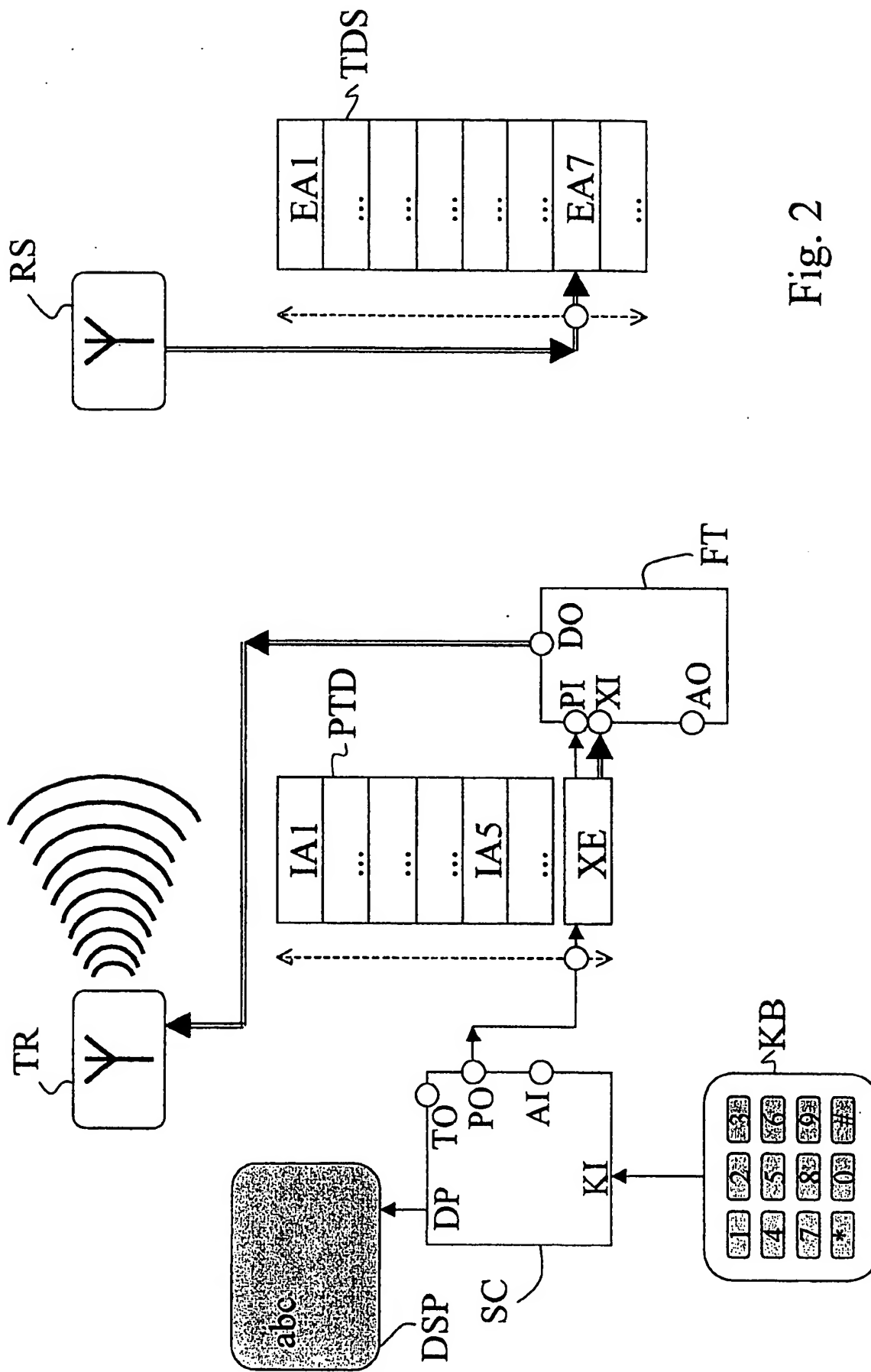


Fig. 2

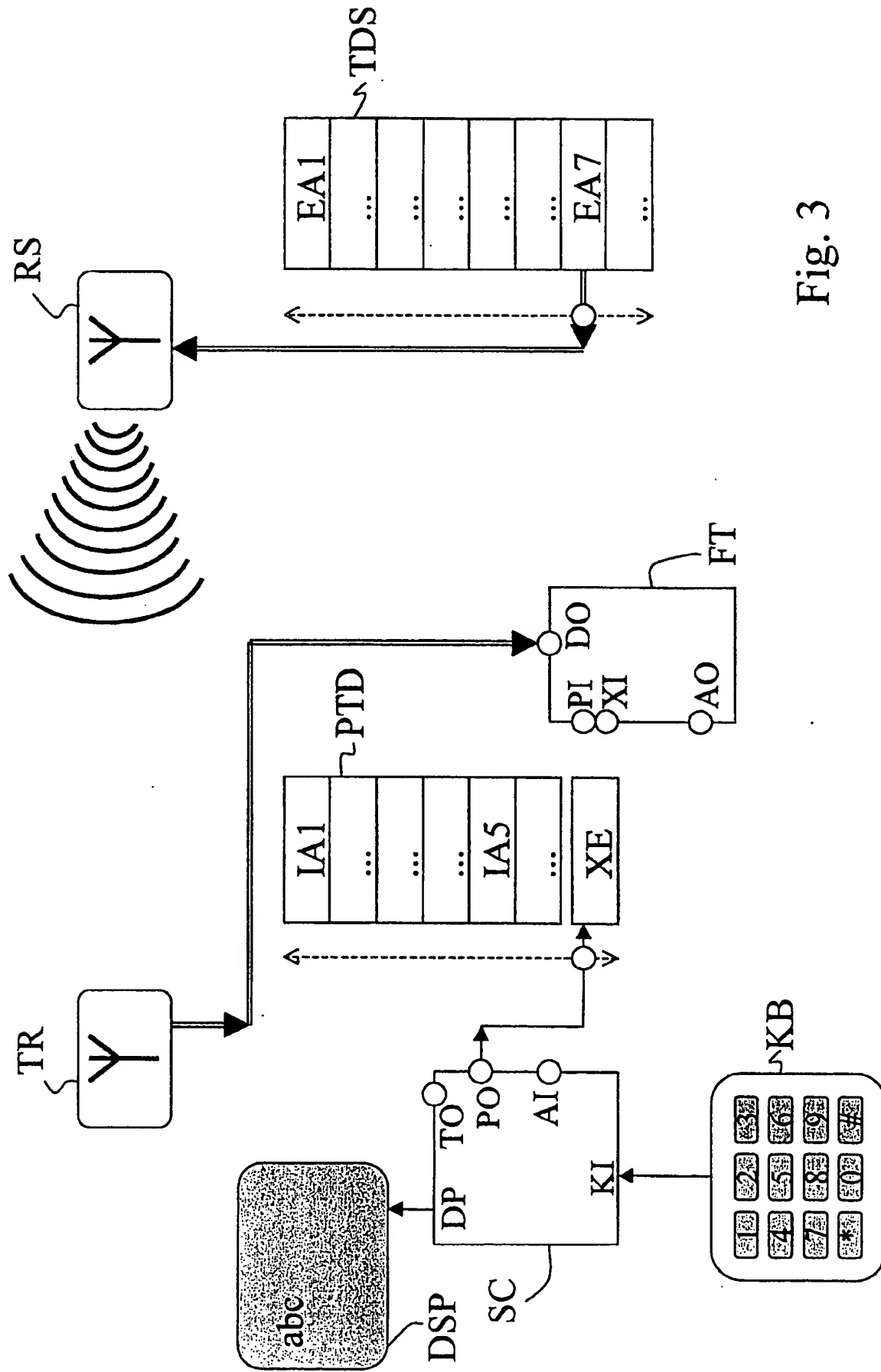


Fig. 3

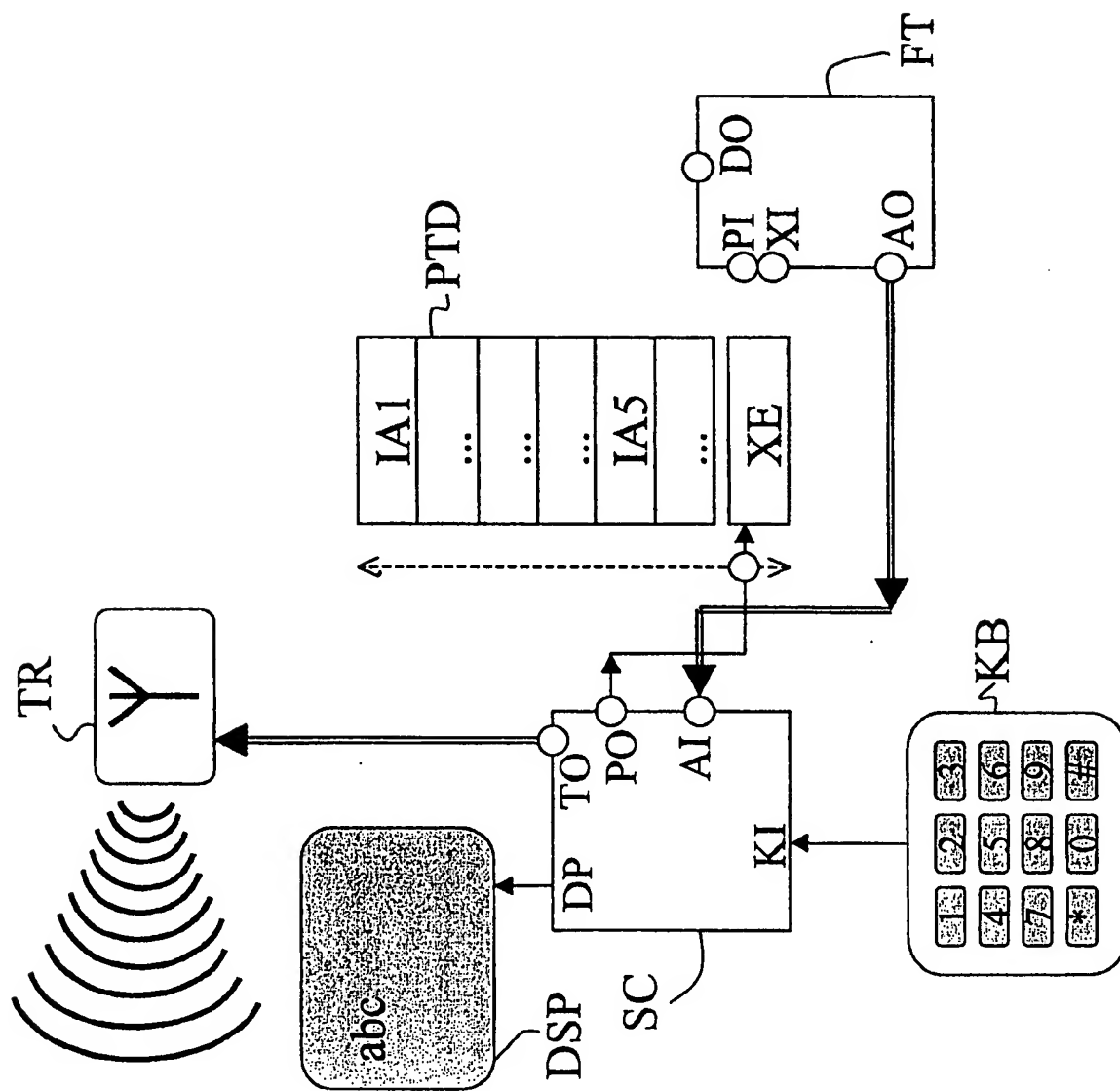


Fig. 4

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